

## Development of SMART-P to improve parental locus of control and children's social-emotional development

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### Article Info

#### Article history:

Received Jan 5, 2023

Revised Oct 31, 2023

Accepted Nov 20, 2023

#### Keywords:

Children

Parent

Parental locus of control

SMART-P

Social emotional development

### ABSTRACT

Child social-emotional development is improved by parental locus of control. Parents with a healthy locus of control can teach children about social-emotional development. Parents require training to improve their parenting skills. This study will create, administer, and evaluate the seamless mobile-assisted real training for parent (SMART-P) application on parental locus of control and children's social and emotional development. The mix-method study used an analysis, design, development, implementation, and evaluation (ADDIE) model and experimental quantification research strategy. An explanatory study with a non-equivalent control group design and control-experiment classes is used. This study includes analysis, design, development, research instrument development, implementation, and assessment. This study sampled 150 parents of 4-year-olds and 6 experts, including 714 from Posyandu (Integrated Service Post) in five Malang City areas. The data was collected via questionnaires and observation checklists. This study analyzes data using descriptive percentages and SPSS. The findings showed that i) SMART-P is valid and acceptable as a training medium; ii) parental locus of parental control is significantly influenced before and after receiving SMART-P parenting training; iii) children's social and emotional development is significantly impacted before and after parents receive care using the program; and iv) there is a significant difference between the experimental and control groups in the influence on parental continuous. SMART-P parenting research is needed to enhance parental locus of control and children's social-emotional development.

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## 1. INTRODUCTION

Social-emotional development is increasingly understood as a crisis in child development [1]. This is because the child's social-emotional development is formed through the process of the child's interaction with the surrounding environment [2]. Young children still cannot comprehend that the environment has a distinct viewpoint [3]. Children still have an egocentric characteristic where they do something for themselves and have not been able to socialize well with others [4]. Therefore, parents must guide their children by creating an environment that fosters their emotional and social growth and by keeping them

engaged in their social environment [5]. Children's socio-emotional development is greatly influenced by the treatment or guidance of parents towards children in introducing various aspects of social life and norms in society [6]. Besides, the children's social processes are also formed through maturity and learning opportunities from responses to behavior [7]. However, the socio-emotional development of a 4-year-old child in preschool often experiences tethering [8]. The issue is brought on by the children's lack of readiness while leaving their parents, tendency to rebel when wanting are not met, refusal to hang out with friends, desire to succeed on their own, and inability to fully adhere to the already existing laws [9].

Issues related to the social-emotional aspect also impact the linguistic aspect [10]. The social problems are exemplified by children's difficulty establishing peer relationships [11]. Health Research and Development Agency [12], which uses the self-reporting questionnaire (SRQ) to assess the population's mental health, found about 9.5% to 14.2% of 4-year-olds that have socio-emotional problems in which negatively affect school development and readiness. Research shows that about 8% to 9% of preschoolers (3-5 years) experience psychosocial problems, especially socio-emotional problems such as anxiety or aggressive behavior [13]. Wei *et al.* [14] mentioned that in China, children's social and emotional development delays are relatively high for children aged 4 years. The main cause is the lack of learning resources, passive parent-child interaction, parenting depression, and low family income [15]. Meanwhile, Qu *et al.* [16] mentioned that indications of children's social-emotional delays of 33.1% is caused by the lack of parental involvement in parenting. Parents tend to focus on work, so the child is not trained to express his emotions. Yamaoka and Bard [17] stated that 26.7% of children experienced a decrease in social-emotional development due to the negative impact of improper parenting on children, causing children to traumatize by their childhood experiences. Therefore, to overcome children's social and emotional problems, parents need to have a locus of control in parenting where they can control feelings and behaviors that negatively impact the child's social and emotional [18].

The locus of control is one of the abilities parents must have in parenting practices [19]. The locus of control is self-awareness, confidence, and the parent's confidence in their abilities in the upbringing [18]. When parents have confidence in their abilities, they will continue to learn to be excellent parents, and they will continue to learn to provide good and optimal parenting [20]. Through the parental locus of control, parents can advise their children on how to best stimulate their growth and development [21]. It will help them continue to monitor their child's development and identify any developmental delays [22]. Besides, parents with a strong locus of control can provide stimulation according to the children's needs [23]. Parents must possess the necessary knowledge, abilities, and self-awareness to choose the best parenting approach in order to continue fostering their children's growth and development [24]. Parenting by parents is frequently disregarded in the absence of parental self-awareness [25].

Incorrect parenting can lead to a child's behavioral deviations and developmental disorders [26]. For instance, unwilling parents to teach and mentor their children may allow them to imitate the characters in their environment, stunting their growth and development [27]. According to Yoshikawa *et al.* [28], parents who lack adequate knowledge and parenting abilities frequently fail to monitor their children's growth and development actively. Another study found that low education contributes to parents' lack of parenting knowledge and abilities [29]. In addition, according to McGregor *et al.* [30], around 200 million young children do not grow and develop to their full potential because of poverty, ill health, malnutrition, and lack of parental stimulation. The child does poorly in school due to developmental disabilities [31]. Lack of locus of control in parents can cause stress and depression in both the child and the parent [32]. Parents of special needs children frequently experience low self-esteem, sadness, guilt, and trouble accepting their child's disability. Thus, their psychological state tends to be negative.

It is also revealed by the National Scientific Council on the developing child. (parents' stress levels can affect their children's psychology. At the same time, the stress in the child can harm cognition and his behavioral and social emotions. Diving into the coronavirus disease 2019 (COVID-19) pandemic, parents who feel depressed make their children feel stressed [33]. Data from Cable News Network (CNN) Indonesia said as many as 13% of children feel stressed because their parents, who feel depressed, have to teach, nurture, and do their work at home. Other data were also presented from databooks.katadata.co.id involving 1,522 parents' psychological condition surveys, and exposed the number of parents who were depressed in their psychological state approximately 23.4% from West Java, 16.9% from DKI Jakarta, 15.5% from central java, and 12.8% from East Java. The cause of depression and stress on parents in parenting are caused because parents cannot control their emotions in parenting [34].

Heinrich [35] mentioned another factor that children's responsibility to their parents is still very low, especially among parents who work. Parents' lack of parental locus of control can cause the children's late development to other children's impaired social-emotional development [36]. Thus, the existence of self-awareness of parents must have parenting knowledge and skills [37]. Knowledge, skills, and the locus of control of parenting can be improved through parenting programs [38].

The problem is that parents still cannot get credible, trustworthy information under expert supervision [39]. Parents also have difficulty adjusting training time to their work [40]. The digital era of technology requires parents to know about child's development, not just mastering digital technology [41]. Therefore, parents need to raise awareness of their parenting knowledge and skills by continuing to learn related to parenting in order to provide appropriate parenting following the children's development [42]. Ozyurt *et al.* [43] determined that the application of parenting in the digital era will be more effective in improving positive parenting and child skills. In line with this opinion, Jackson *et al.* [44] revealed that using digital technology in learning and parenting can improve the ability to recognize the alphabet, reading skills, language and math skills. It can also help improve visual intelligence and psychomotor skills at the cognitive level [45]. Corralejo and Rodríguez [46] summarized that the technologies used in parenting reflect ubiquitous learning using websites and computer programs. From the previous research, a parenting program has not been found that focuses on increasing parental locus of control in parents. To build learning motivation, the plurality of acquiring parental knowledge and self-awareness of the importance of child development at an early age requires a locus of control in parents. Therefore, parenting programs using seamless mobile assisted real training for parents (SMART-P) are designed to increase parental locus of control and maximize children's social-emotional development so that the knowledge and parenting skills gained in training are applied optimally.

Seamless learning can be applied in parenting training [47]. Seamless learning emphasizes ease of access so parents can carry out training activities anywhere and anytime [48]. Seamless learning can be implemented using mobile phones [49]. Since parents may access it, SMART-P is a parenting education medium. SMART-P parenting education allows parents the freedom to have faith in their kids' intelligence and parenting abilities. Parent's confidence and confidence in the care they take after using SMART-P will significantly facilitate optimal stimulation. With the aid of mobile devices, SMART-P aims to give parents a greater sense of locus of control by encouraging them to maintain good self-discipline, concentrate on raising their children, and learn the necessary skills under the direction and supervision of professionals in their respective fields. Increased self-confidence, self-control, and confidence in parents' ability to care also helps build a relationship between parent and child attachment so that parents easily regard the potential and talents of the child, and the provision of stimulation can also be optimized. Therefore, this study aims to determine and test the effectiveness of the SMART-P to improve parental locus of control. Thus, this research includes i) the development and implementation of SMART-P applications; ii) the effect of SMART-P training on parental locus of control in parents before and after training; iii) the effect of SMART-P training on children's social and emotional development before and after training; iv) the effect of SMART-P training on parental locus of control in the control and experimental groups differ; and v) differences in the effect of SMART-P training on children's social and emotional development in the control and experimental groups.

## 2. RESEARCH METHOD

### 2.1. Research design

This research uses mix method research with the analyze, design, development, implementation, and evaluation (ADDIE) model and experimental quantitative research approach. The ADDIE development model has a systematic structure and steps to develop android applications that are very suitable for developing SMART-P application [50]. Meanwhile, a quantitative research approach is chosen to implement and test the effectiveness of SMART-P products. The research method used is explanatory research with a non-equivalent control group design involving control and experimental classes. The pre-test and post-test in this training use the SMART-P application. This treatment is carried out for three weeks. In this study, the ADDIE model procedure can be seen in Figure 1.

At this first stage of research, a needs analysis is carried out. The analysis consists of the target audience and analysis of topics and tasks. The needs analysis stage is used to identify the extent to which parents have mastery of material regarding parenting skills and the motor development of children. Next, the target audience analysis stage is used to identify the time allocation, user interest, accessibility, demographics of residence, and the ability to use technology. The final stage of analysis is the analysis of user tasks and topics. Tasks and topics are developed based on theoretical studies from various book sources and research results, especially recent journals published on related topics.

After conducting the analysis, the next step is to design the SMART-P application. This stage consists of several parts, which are material design, media design, and instructional design. Material design relates to preparing material that is considered relevant to be presented to participants in the form of e-books, video tutorials, and parenting modules. Media design includes application storyboards that provide an overview of the application from start to finish. The storyboard covers nine main features of the SMART-P application: growth tracker, development tracker, vaccination tracker, nutrition tracker, tips, consultation,

parenting, parenting assessment, and logbook. Furthermore, the instructional design is designed to design the learning environment parents use in carrying out training using SMART-P. The instructional design comprises five processes, such as formulating learning objectives, defining learning strategies, instructional strategies, delivery strategies, and evaluation strategies.

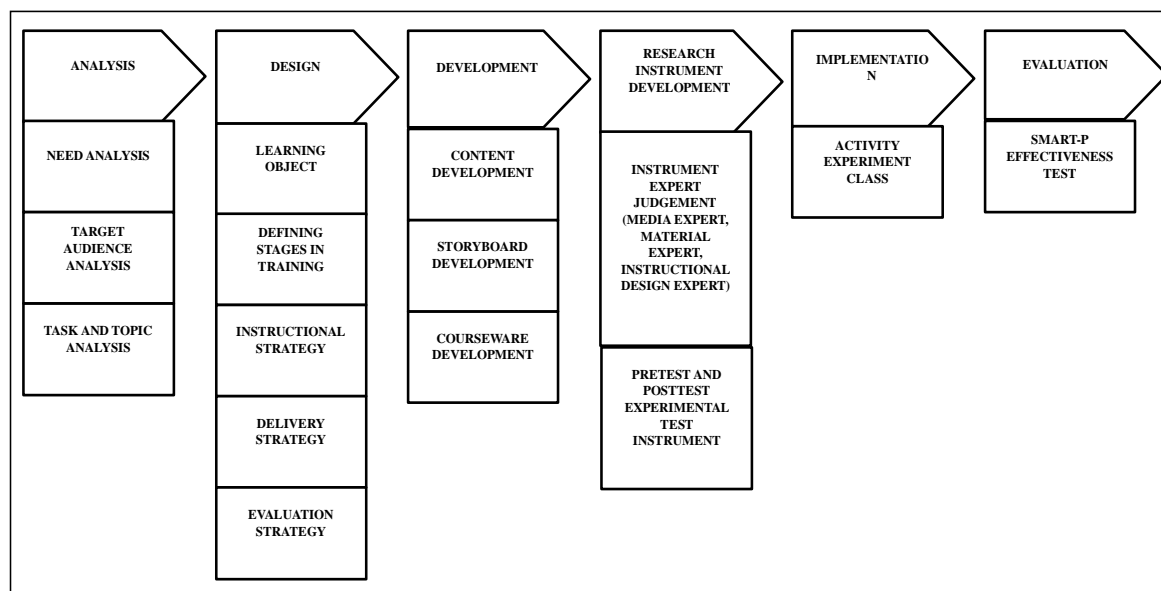


Figure 1. Research procedure

The next stage is the development of the SMART-P application. At this stage, researchers create menu icons and display the SMART-P application. Then the display design is finalized at the program build stage using the Android application. The researcher also created a panel for submitting and editing materials in the application using an Application Programming Interface (API) with Laravel code whose operations were carried out by the admin. The material that can be input is in the form of text, images, videos, and links.

After the application development is complete, the researcher makes an instrument to test the feasibility of the application. The instrument is aimed at media, materials, and instructional design experts. The valid SMART-P application is then uploaded to the play store and implemented by participants through parenting activities that will be carried out online and offline. Activities are carried out offline on the first day for application distribution, installation, and the SMART-P application introduction. Furthermore, the training is carried out online using the SMART-P application. At the end of the meeting, an evaluation was conducted by holding a post-test through the SMART-P application to determine the effectiveness of the training carried out. The schedule of implementation SMART-P application is held based on Table 1.

Table 1. The schedule of implementation program

Date	Group	Types of courses	Types of activities	Place/meeting
July 12th 2022-August 2nd, 2022	Control group	Parental locus of control	Pretest with true or false questions	Face to face on first time using Google Form
			Conventional parenting training	Face to face training on the first meeting
		Children's social emotional development	Posttest	Online (flexible) using WhatsApp
			Observation using questionnaire	Online on the last date of program
July 13th 2022-August 3rd, 2022	Experimental group	Parental locus of control	Pretest with true or false questions using SMART-P	Online using google form.
			SMART-P parenting training program	Face to face on first time using SMART-P
		Children's social emotional development	Posttest using SMART-P	Online using SMART-P
			Observation using Questionnaire	Online using SMART-P in the last program

## 2.2. Data collection techniques

The population in this study was 714 parents with children aged 4 years from Posyandu/KB (Integrated Service Post) in five districts of Malang City, Indonesia. These sub-districts include Blimbing, Kedung Kandang, Klojen, Lowokwaru, and Sukun. The results of the population collection can be seen in Table 2. Samples in this study include 30 respondents consisted of parents with 4-year-olds children, selected for random needs analysis outside the research sample and 120 respondents consisting of parents and 4-year-olds children, selected using purposive sampling with two techniques, namely non-random sampling and sampling according to the criteria: parents have a child aged 4 years; willing to take part in a series of SMART-P training; have a compatible android smartphone and capable of operating it; and be able to use the application. There were six experts selected used purposive sampling techniques with criteria as program assessors who have taught and have experience in the scientific field for less than 5 years. The expert consists of two media experts, two material experts, and two instructional design experts. Expert validation name who will validate SMART-P application is mentioned in Table 3. The sample in this study is 150 people with children aged 4 years and 6 experts.

Table 2. Population

No	District	Population	Sample
1.	Blimbing	144	24
2.	Kedung Kandang	141	24
3.	Klojen	153	24
4.	Lowokwaru	143	24
5.	Sukun	133	24
Total		714	120

Table 3. Expert validation name

Kind of validator	Position	Department	University
Media expert A	Head of department	Educational Technology	University A
Media expert B	Senior lecturer	Department of Basic Education and Social Science School of Education	University B
Material expert A	Professor in educational science	Non-Formal Education	University A
Material expert B	Senior lecturer	Department of Basic Education and Social Science School of Education	University B
Instructional design expert A	Master and doctoral of educational technology study program	Educational Technology Study Program.	University A
Instructional design expert B	Lecturer	Department of Science Mathematics and Creative Multimedia, School of Education	University B

## 2.3. Research instruments

The data collection technique in this study used questionnaires and observation checklists. The required questionnaire includes:

- Analytical instruments for parents consisting of: need analysis as many as 8 question items and target audience analysis as many as 7 question items.
- The parental locus of control instrument for parents is 47 question items consisting of five dimensions, namely parental self-efficacy as many as 10 question items. Parental responsibility as many as 10 question items. Child control of parent's life as many as 7 question items. Parental belief in fate/chance as many as 10 question items, and Parental control of child's behavior of 10 question items.
- Expert instruments consist of: i) media experts of 5 dimensions, including the design of as many as 5 question items. Easiness and Interaction as many as 5 question items. Technology requirement as many as 4 question items. Qualification as many as 5 question items. Language and relevance have as many as 11 question items; ii) material experts consist of 8 dimensions, including growth tracker with as many as 6 question items. Development tracker as many as 29 question items. Vaccination tracker as many as 6 question items. Nutrition tracker as many as 6 question items. Tips as many as 6 question items. Consultation as many as 3 question items. Parenting as many as 9 question items; parenting assessment of 22 question items; and iii) instructional design experts consist of 5 dimensions covering learning needs of 5 question items, lesson planning as many as 5 question items, learning objectives as 2 question items, learning strategies as many as 10 question items, and learning evaluation and contextual assessment of 4 question items.

- The checklist sheet for children's social emotional development is 32 items consisting of 3 dimensions, namely social competence as many as 8 items, emotional competence as many as 5 items and personality as many as 19 items.

## 2.4. Data analysis techniques

This study uses descriptive percentage analysis to describe the need for expert analysis and assessment. Subsequently, testing the effectiveness of SMART-P against parental locus of control and children's social-emotional development includes: i) validity test instruments using product moment correlation; ii) reliability instruments using Cronbach's alpha; iii) normality tests using Kolmogorov Smirnov Statistic; and iv) homogeneity test uses Levene Statistic. Furthermore, the data has been obtained and analyzed using the statistical package for the social sciences (SPSS) software with Paired sample t-test (for research questions 2 and 3) and an independent sample t-test (for research questions 4 and 5).

## 3. RESULTS

### 3.1. Respondent analysis

In this study, research respondents were drawn from several categories, based on the analysis of respondents covering gender, parent age, education, and gender. The category selection is different for the control class and the experiment class. The results of the respondent analysis are described in Table 4.

Table 4. Respondent description

No	Characteristics of respondents		Control class		Experiment class	
			$\Sigma$	%	$\Sigma$	%
1	Gender of parents	Man	6	10%	9	15%
		Women	54	90%	51	85%
2	Parents age	21-25 years	2	3.33%	2	3.33%
		26-30 years	21	35%	19	31.67%
		31-35 years	22	36.67%	22	36.67%
		36-40 years	9	15%	12	20
		>40 years	6	10%	5	8.33%
3	Education of parents	Junior high school	13	21.67%	12	20%
		Senior high school	23	38.33%	20	33.33%
		Diploma	5	8.33%	8	13.33%
		Bachelor	16	26.67%	16	26.67%
		Master	3	5%	4	6.67%
4	Child gender	Boy	27	45%	29	48.33%
		Girl	33	55%	31	51.67%

According to the gender of the parents, their age, their education level, and the gender of the children, the respondents' characteristics in this study are categorized into four categories. According to the characteristics of respondents based on the gender of the parents, there is a noticeable difference between the control group and the experimental group in terms of the proportion of males and women, with 90% and 10% in the former and 85% and 15% in the latter. Second, the characteristics of respondents based on age in this study, both control groups and experiments, show that the most age was found at the age of 31-35 years with the same number of 36.67%, and the least participants are the age group of 21-25 years. Third, the results of respondents' characteristics based on parental education in both the control group and experiments show that most respondents had a high school education background, namely 38.33% in the control group and 33.33% in the experimental group. At the same time, the least level of education is a masters. Fourth, the gender grouping of children in the experimental and control groups showed almost the same percentage in girls, with a large percentage of more than 50%.

### 3.2. Development and implementation of SMART-P application

SMART-P was developed in the form of an android application so that it can be easily accessed by parents. SMART-P has registration features so parent who want to using SMART-P application must register first. The results of the SMART-P application development can be seen in the Figure 2.

Before SMART-P is used as training media, SMART-P is validated by media experts to determine the feasibility of SMART-P itself. The results of media expert validation are shown in Table 5. The conclusions from the validation results of media experts in the SMART-P application can be seen in Table 5. The result of design, easiness and interaction, technology requirements, qualification, and language and relevancy have an average value of 47.4 with a percentage of 98.75%. The overall validation results make the

SMART-P application fall into very suitable/very good to use. So, media on SMART-P application is suitable for implemented. The same goes for the material in the SMART-P app. The following are the results of the percentage of material in the SMART-P application as shown in Table 6.

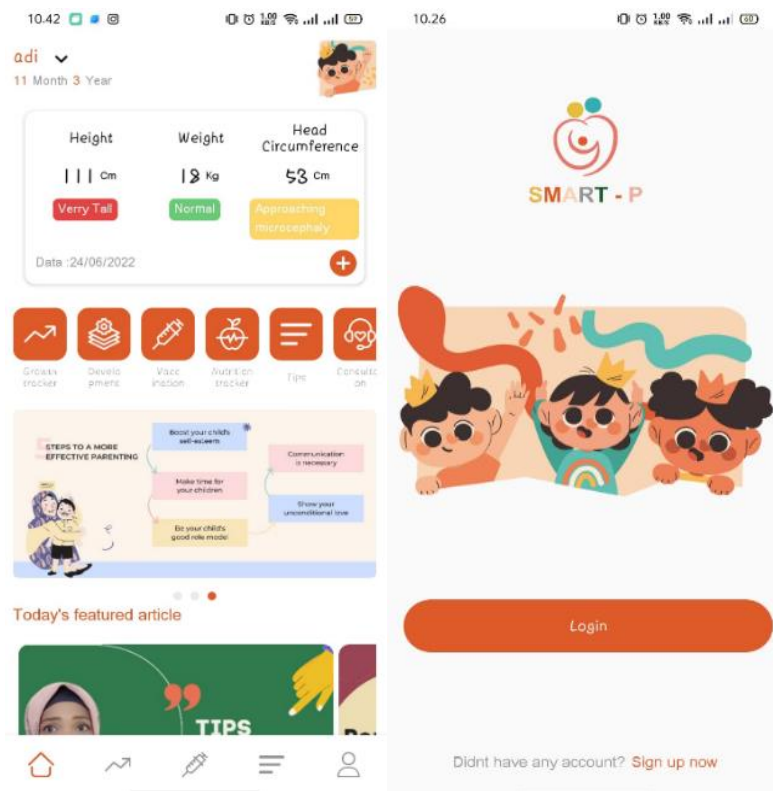


Figure 2. SMART-P

Table 5. Media expert validation results

No	Dimension	Percentage	Note
1	Design	100%	Very suitable/very good
2	Easiness and interaction	95%	Very suitable/very good
3	Technology requirement	96.87%	Very suitable/very good
4	Qualification	100%	Very suitable/very good
5	Language and relevancy	100%	Very suitable/very good
Overall media expert		98.75%	Very suitable/very good

Table 6. Material expert validation results

No	Dimension	Percentage	Criteria
1	Growth tracker	91.6%	Very suitable/very good
2	Development	99.56%	Very suitable/very good
3	Vaccination	100%	Very suitable/very good
4	Nutrition	100%	Very suitable/very good
5	Tips	100%	Very suitable/very good
6	Consultation	100%	Very suitable/very good
7	Parenting	87.5%	Very suitable/very good
8	Parenting assessment	97.12%	Very suitable/very good
Overall material expert		97.26%	Very suitable/very good

The conclusion obtained from all items in the parenting assessment material is that the average value in the parenting assessment is 84.62, with a percentage of 97.26%. The previous statement shows that the SMART-P application material is suitable as parenting training material. The same goes for the design instructional in the SMART-P app. The following are the results of the percentage of design instructional in the SMART-P application as shown in Table 7.

Table 7. Design instructional expert validation results

No	Dimension	Percentage	Criteria
1	Learning needs	92.5%	Very suitable/very good
2	Lesson planning	97.5%	Very suitable/very good
3	Learning objectives	87.5%	Very suitable/very good
4	Learning strategies	92.5%	Very suitable/very good
5	Learning evaluation and contextual assessment	93.35%	Very suitable/very good
	Overall design instructional expert	89.98%	Very suitable/very good

Based on the overall dimensions result of the instructional design used in the SMART-P application. 89.98% was obtained. These results show that the instructional design on SMART-P application is very suitable/very good to be applied as a medium in parenting training using SMART-P. The validity results in the Table 8 show that all parental locus of control variable items is greater than  $>0.296$  (r-table). It shows that the entire parental locus of the control variable is said to be valid. At the same time, based on the reliability results on the parental locus of the control variable, the reliability value is between 0.844-0.872. It shows that each variable in the parental locus of control dimension is included in the good category because it has a coefficient value of more than 0.8. The validity and reliability result are described in Table 8.

Table 8. Validities and reliability parental locus of control

No	Dimension	Validities	Cronbach's alpha coefficient value	Note
1	Parental efficacy	0.516-0.713	0.867	Good
2	Parental responsibility	0.504-0.713	0.855	Good
3	Child control of parent life	0.471-0.780	0.844	Good
4	Parental belief in change/fate	0.498-0.823	0.853	Good
5	Parental control of child's behavior	0.503-0.776	0.872	Good

The Normality test is performed to see whether the independent and the corrected variables have normal or abnormal distribution standards. Normality testing conducted using the Kolmogorov-Smirnov test showed normally distributed data if the significance value was above 5% or 0.05. Meanwhile, if the significance value is below 5% or 0.05, the data is not normally distributed. Based on the normality test results in the Table 8, obtained pretest and posttest values in control and experimental groups showed a significant value of  $>0.05$ . It shows that all variables of parental locus of control can be said to be normally distributed. The Normality test result is mentioned in Table 9.

Table 9. Normality test results

No	Group	Kolmogorov Smirnov statistic	Asymp. sig	Explanation
1	Pre-test locus of control group	0.200	0.070	Normal
2	Post-test locus of control group	0.205	0.071	Normal
3	Pre-test locus of control experiment group	0.200	0.078	Normal
4	Post-test locus of control experiment group	0.209	0.071	Normal

Homogeneity tests are carried out to determine whether the variants in the data population are the same or if there are differences with the test criteria. If the significance value is  $>0.05$ , then it can be said that the variance in the group is said to be the same (homogeneous). The statistical Levene test results on the parental locus of the control experimental group and control group obtained a significant value of  $>0.05$ . Thus, it can be said that there is no difference in variants between the samples in the group. It shows that the variations of the sample in the group are the same (homogeneous). The homogeneity test result is mentioned in Table 10.

Table 10. Homogeneity test results

No	Group	Levene statistic	Asymp. sig	Explanation
1	Pre-test locus of control control-experiment group	1.33	0.251	Homogenous
2	Post-test locus of control control-experiment group	3.618	0.06	Homogenous



### 3.3. Effect of SMART-P on parental locus of control in parents before and after training

#### 3.3.1. Effect of conventional parenting training programs on parental locus of control

In the implementation of the training program, especially in the control class, the conventional learning method was used. The results of the training were then analyzed for pretest and posttest to see if there was an increase after the intervention. The results of the parental locus of control test in the conventional group are shown in Table 11.

Based on the research results, the overall dimensions of the parental locus of control variables in the control group are obtained. The average value of the pretest is 64.36 with a standard deviation of 5.22 is known to increase to 73.66 with a standard deviation of 9.30, it means that there is an average increase of 10.91 points. Then the t-test results of the paired samples also show a t-count value of 20.185 > 2.003 and significance value  $0.000 < 0.05$ . The findings indicate that conventional parenting education programs had a substantial impact on pretest and post-test values or that the programs are able to raise the overall dimension of parental locus of control in parents following training.

Table 11. Test results paired sample t-test parental locus of control

No	Dimension	Pre-test		Post-test		Gain	t-count	Sig
		Mean	SD	Mean	SD			
1	Parental efficacy	64.74	8.49	74.05	11.32	9.31	12.330	0.000
2	Parental responsibility	60.52	11.33	70.77	12.27	10.25	18.703	0.000
3	Child control of parent life	73.47	11.74	84.54	11.10	11.08	9.734	0.000
4	Parental belief in change/fate	65.75	9.44	74.66	11.03	8.91	10.768	0.000
5	Parental control of child's behavior	61.80	8.77	70.54	10.85	8.74	9.501	0.000
	Overall	64.36	5.22	73.66	6.67	9.30	20.185	0.000

#### 3.3.2. Effect of SMART-P based parenting training programs on parental locus of control

In the implementation of the training program, especially in the experimental class using the SMART-P application. The results of the training were then analyzed for pretest and posttest to see if there was an increase after the intervention using the SMART-P application. The results of the parents' locus of control test in the experimental group are shown in Table 12.

Table 12. Results of paired sample t-test parental locus of control in the SMART-P application assisted experimental group

No	Dimension	Pre-test		Post-test		Gain	t-Count	Sig
		Mean	SD	Mean	SD			
1	Parental efficacy	62.67	7.58	81.13	7.07	18.47	20.199	0.000
2	Parental responsibility	61.07	8.72	76.86	8.12	15.79	15.991	0.000
3	Child control of parent life	74.33	10.28	91.29	7.83	16.96	12.102	0.000
4	Parental belief in change/fate	62.54	7.74	82.25	8.10	19.71	18.640	0.000
5	Parental control of child's behavior	63.03	7.81	79.53	6.26	16.50	18.293	0.000
	Overall	63.80	4.08	81.16	4.46	17.36	34.785	0.000

The overall dimensions of the experimental group's parental locus of the control variable showed an average pretest value of 63.80 with a standard deviation of 4.08, then increased to 81.16 with a standard deviation of 4.46 means an average increase of 17.36 points. Then the paired sample t-test also showed a t-count value of 34.785 > 2.003 and a significance value of  $0.000 < 0.05$ . The results showed a difference in pretest and posttest values or a significant impact of the SMART-P application-assisted parenting training program, where the program can increase the dimension of parents' parenting skills after training.

### 3.4. The effect of SMART-P on children's social emotional before and after parenting training

#### 3.4.1. The influence of conventional parenting program training on the socio-emotional development of children

After the implementation using conventional methods, children's social-emotional skills are also seen based on the results of interventions provided by parents. This aims to see whether the method applied is successful in improving aspects of children's social emotional development. Table 13 shows the results of testing children's social-emotional abilities after being given an intervention using conventional training methods.

Table 13. Results of paired sample t-test on socio-emotional development of children in conventional parenting program

Dimension	Pretest %	SD	Posttest %	SD	Gain	t-count	Sig
Social competence	55.25%	1.171	69.00%	1.193	13.75%	2.315	0.000
Emotional	52.75%	0.976	66.75%	1.087	14.00%	2.237	0.000
Personality	53.75%	1.011	67.75%	1.097	14.00%	2.254	0.000
Overall	53.92%	1.053	67.83%	1.126	13.92%	2.269	0.000

Based on the data results, the exposure indicates an increase in the value of aspects of the child's social and emotional development. It can be seen from the pretest value of 53.92% rose to 67.83%. After parents received standard instruction, the social and emotional development of the children increased by 13.92%. Then in the paired test results, the sample t-test shows a calculated t-value of  $2.269 > 2.003$  and significance values of  $0.000 > 0.05$ . These results demonstrate a considerable improvement in children's social and emotional development following standard parenting education.

### 3.4.2. Effect of SMART-P parenting training program on children social and emotional development

After the implementation using conventional methods, children's social-emotional skills are also seen based on the results of interventions provided by parents. This aims to see whether the method applied is successful in improving aspects of children's social emotional development. Table 14 shows the results of testing children's social-emotional abilities after being given an intervention using SMART-P application.

According to the results, parents who received SMART-P parenting training valued areas of children's social and emotional development more. The pretest value of 55.33% rose to 90.25%, as can be observed. After parents received SMART-P training, children's social and emotional development improved by 34.92%. A calculated t-value of  $2.367 > 2.003$  and significance values of  $0.000 > 0.05$  are then displayed in the test findings. These results demonstrate a considerable improvement in kids' social and emotional growth following SMART-P parenting instruction for parents.

Table 14. Results of paired sample t-test on socio-emotional development of children using SMART-P program

Dimension	Pretest	SD	Posttest	SD	Gain	T-count	Sig
Social competence	56.50%	1.179	91.75%	1.207	35.25%	2.407	0.000
Emotional	54.25%	1.013	89.25%	1.139	35.00%	2.378	0.000
Personality	55.25%	1.057	89.75%	1.151	34.50%	2.317	0.000
Overall	55.33%	1.083	90.25%	1.166	34.92%	2.367	0.000

### 3.5. Differences in the effect of SMART-P training on parental locus of control in the control group and experimental group

After testing the results of the pretest and posttest on parental locus of control between the control and experimental groups, researchers conducted an analysis using an independent sample t-test to determine the difference in improvement in parental locus of control between groups. The test results can be seen in Table 15.

A gain value of 9.30 is known for the control group's parental locus of the control variable's overall dimensions, while 17.36 is known for the experimental group. It is clear by comparing the gain values of the two groups that the gain value rises following training. However, the experimental group that uses SMART-P application-assisted training continues to show the greatest improvement. Then the t-test results of the paired samples also showed a t-count value of  $11.687 > 2.003$  and significant value  $0.000 < 0.05$ . The results show a difference in the value of gains with significant results.

Table 15. Result of independent sample t-test on parenting knowledge

No	Dimension	Gain control	Gain experiment	t-count	Sig
1	Parental efficacy	9.31	18.47	7.519	0.000
2	Parental responsibility	10.25	15.79	4.768	0.000
3	Child control of parent life	11.08	16.96	3.304	0.001
4	Parental belief in change/fate	8.91	19.71	8.350	0.000
5	Parental control of child's behavior	8.74	16.50	6.296	0.000
	Overall	9.30	17.36	11.687	0.000

### 3.6. Differences in the effect of SMART-P training on children's social and emotional development in the control group and experimental group

After testing the results of the pretest and posttest on social emotional development between the control and experimental groups, researchers conducted an analysis using an independent sample t-test to determine the difference in improvement in social emotional development between groups. The test results can be seen in Table 16. The research found that all aspects of the child's social and emotional development received a gain value of 13.92% in the control group and 34.92% in the experimental group. After parents had parenting training, the social-emotional development value increased based on the gain values of the two groups. However, the experimental group that used SMART-P application-assisted training continues to show the greatest improvement. After that, the paired sample t-test results revealed a t-count value of  $2.501 > 2.003$  and a significant value of  $0.0000 < 0.05$ . After parents received SMART-P assisted parenting training, the results indicate a difference in the value of gain with substantial results, indicating that children's social and emotional development improved.

Table 16. Result of independent sample t test SMART-P training on children's motor development

Dimension	Gain control	Gain experiment	t-count	sig
Social competence	13.75%	35.25%	2.517	0.000
Emotional	14.00%	35.00%	2.479	0.000
Personality	14.00%	34.50%	2.507	0.000
Overall	13.92%	34.92%	2.501	0.000

## 4. DISCUSSION

### 4.1. Design and development of SMART-P

The five steps of SMART-P application development are referred to as ADDIE. The ADDIE model is not meant to be rigid but is viewed as a more flexible research methodology [50]. First, an analysis consists of three stages, such as a need analysis, a target audience analysis, and a task and topic analysis. Each of the three has a data-collecting function that accurately assesses the user's application needs. Next, the design part consists of three parts which are media design, material design, and instructional design. Material preparation for presentation to participants is referred to as material design. An application storyboard, which is intended to give a comprehensive picture of the application from beginning to end, is included in the media design. The storyboard covers nine main features of the application, including a growth tracker that detects children's growth rates. Development tracker serves to detect the rate of development of children. Vaccination tracker records vaccination schedules that have been or have not been carried out by children. A nutrition tracker serves to detect what nutrients can be given to children. Tips serve to provide advice and information related to parenting. Consultation serves to bridge parents with experts and ask questions. Parenting serves to contain information about how parenting should be carried out. Parenting assessment measures three main parenting variables, namely parenting knowledge, parenting skills, and parental locus of control, and finally, the logbook serves as a daily journal of parents. The third stage is the instructional design which aims to design a training system on the SMART-P application. After the design and design of the SMART-P have been completed, the next step is to develop the SMART-P application.

Design work for user interfaces, feature buttons, and interactive conversation boxes that emerge in response to specific inputs is done during the courseware creation stage. The X8 version of Corel Draw software was used to create the design for this application. Furthermore, it moves onto the program build stage after the design appearance is decided. The program used is Android Studio, the official Android IDE. Next, a panel must be created utilizing the API and Laravel code. For in-app editing content, use this panel. Admins typically change the organization of the information, including the text, images, and video links. Views and the execution of functions are the end outcomes of all features that have been completed. The created features are broken down into registration menus, the main menu of the application, and the app's primary features. An expert evaluation is conducted following the program's conclusion. The validator experts note a few modifications, including the addition of the Android operating system version, detailed instructions for using the application at first use, modifications to the image components used, the addition of media sources, and modifications to the assessment format for parenting assessments. Additionally, users are introduced to the SMART-P program as a tool for parenting education through installation, distribution, and training.

### 4.2. The effect of SMART-P toward parental locus of control before and after program implementation among parents

The results show an increase in parents' parental locus of control both before and after parenting training. The increase in parental awareness variables occurs because parents' willingness to learn increases

after training. Parents are becoming increasingly aware that non-optimal parenting harms the growth and development of the child. One foundation of effective parenting is keeping parents' awareness in mind. It is consistent with Wang's research from 2018, which found that parenting knowledge impacts kids' physical and psychological growth. Well-informed parents will give their children adequate care by monitoring their growth and development, ensuring proper diet, administering vaccinations, and being aware of the need to keep learning as parents [51].

After receiving supported training for SMART-P applications, the parental locus of control variables in the dimensional experimental class significantly improved. This increase occurs because parents can easily access information about parenting awareness. Parents become more aware of the importance of awareness in parenting. The awareness in question plays a role so that parents can continue to learn and improve parenting styles according to the child's condition. Research from Mercer [52] stated that parents who have parenting awareness have children with high emotional closeness. It is because parents work hard to provide for their kids by developing tight relationships with them. Parents that are aware of effective parenting practices avoid controlling their children. They improvise regarding what has to be corrected or maintained.

#### **4.3. The effect of SMART-P toward children's social emotional development before and after program implementation among parents**

The study results show that all aspects of the dimension of social-emotional development in children have increased significantly. The rise is attributable to parents taking part in education courses to learn more about breastfeeding, where they start to act in ways that support their children's social-emotional needs. Hawkins made a related argument as well. Chingono *et al.* [53] reported that parents need to provide opportunities for children to carry out their daily activities outside the home, where children can improve their social development with the surrounding environment. However, Dalton *et al.* [54] mentioned that parents are still too worried and tend to have doubts about their children. It harms the child's social and emotional development when parents are convinced to restrict children from playing at home. The cause is due to parental locus of control in parents who are still not well developed [19].

According to the study, children's emotional and social development in the experimental group was far more advanced than in the control group. It is because SMART-P coaches are provided for parents, and SMART-P applications are created and overseen by early childhood specialists. The ability of parents to control their locus of control is highlighted by SMART-P parenting coaches so that parents may learn how to act and behave as parents. It is in line with the research conducted by Freed and Tompson [55], where the parental locus of good control in parents allows parents to control the care they carry out. In order to overcome externalization and internalization issues and establish social and non-social abilities during the child's developmental stage, the presence of the parental locus of control in parents alters parents' perceptions of the significance of child development [56]. In order to establish the limits of appropriate behavior while dealing with issues with children, parents must build habits in supervising their care.

#### **4.4. The effect of SMART-P for parental locus of control in the control group and the experimental group**

The results showed that from five dimensions contained in the parental locus of control, all showed significant differences. The five dimensions are parental efficacy, parental responsibility, child control of parent life, parental belief in change/fate, and parental control of the child's behavior. Because the experimental group's gain is so much more than the control groups, it is considered significant. The study's findings demonstrated that the experimental class experienced a more significant gain in the parental locus of the control variable than the control class. The high gain value in the experimental class is due to the training provided with the help of the SMART-P application. The material compiled in the application provides convenience so that parents systematically understand what parenting awareness is. Parents do not just acquire material in the abstract but also do consultations and even practices. Parents are given a module dealing with ideal parenting through the parenting feature. Then, parents may carry out parenting practices using tracking tools like growth trackers, development trackers, vaccine trackers, consulting features, and the writing feature in the log book. Increased awareness in parents makes children emotionally happy. Kildare and Middlemiss [57] found that parenting awareness is linked to the ability of parents to manage their emotions, listen intently to their children, remain aware of their emotional experiences, control their own emotions while raising their children, accept and not judge their children, and have compassion for them.

#### **4.5. The effect of SMART-P for children's social emotional development in the control group and the experimental group**

The results showed a significant increase in the overall aspects of children's social and emotional development. It is seen from the significant differences between the control and experimental groups, where parents who were given training using SMART-P showed improvements in aspects of children's social and

emotional development. It is in line with Baker's training shows that parenting training using digital technology can improve aspects of child development [58]. The SMART-P application positively impacts parental locus of parental control so that parents can control their feelings in parenting. SMART-P is an alternative to digital parenting for parents. SMART-P is designed to give parents easy access to parenting training in their spare time. Flexible training stated by Wong [59] that parenting using seamless learning methods helps parents upgrade their parental locus of control easily. As a result, parental locus of control needs to be enhanced so parents may encourage their children's social and emotional development and ensure that it progresses as intended.

## 5. CONCLUSION

According to the study's findings, it is found that: i) The SMART-P application is created and is designed with parents in mind. In addition, the SMART-P application is proven reliable and appropriate for parenting education by an accurate report from an expert; ii) Parental locus of control is significantly restricted in parents' pre- and post-SMART-P training periods. The parental control value, higher than the post-test value in conventional training, can be seen from the post-test parental locus; iii) An increase in aspects of social-emotional development in children before and after parents are given training using SMART-P is identified. It is evidenced by the percentage of the value of aspects of social-emotional development in the experimental group, which is much larger than the control group; iv) A significant difference in parental locus of parental control in the control group and the experiment group is identified; and v) A significant difference in the aspects of parental social-emotional development in the control group and experimental group. In the case of good parents, parental locus of control affects the improvement in all facets of social-emotional development are also identified. It is necessary to provide parents with regular SMART-P parenting training. Deficits in this parenting application should be able to be identified with more research.

## ACKNOWLEDGEMENTS

The researchers would like to express gratitude to everyone who participated in the study. The researchers expect that by conducting this study, parents will be able to learn more effectively and benefit institutions and the education field.

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